

# MICHAEL CRICHTON

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## SPEECHES

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### THE CASE FOR SKEPTICISM ON GLOBAL WARMING

National Press Club

Washington DC

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*Michael's detailed explanation of why he criticizes global warming scenarios. Using published UN data, he reviews why claims for catastrophic warming arouse doubt; why reducing CO2 is vastly more difficult than we are being told; and why we are morally unjustified to spend vast sums on this speculative issue when around the world people are dying of starvation and disease.*

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**BOOKS & MOVIES**

**SPEECHES**

**ESSAYS**

**VIDEO**

**FOR YOUNGER READERS**

**MESSAGE BOARD**

**PRESS**

**HOME**

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To be in Washington tonight reminds me that the only person to ever offer me a job in Washington was Daniel Patrick Moynihan. That was thirty years ago, and he was working for Nixon at the time. Moynihan was a hero of mine, the exemplar of an intellectual engaged in public policy. What I admired was that he confronted every issue according to the data and not a belief system. Moynihan could work for both Democratic and Republican presidents. He took a lot of flack for his analyses but he was more often right than wrong.

Moynihan was a Democrat, and I'm a political agnostic. I was also raised in a scientific tradition that regarded politics as inferior: If you weren't bright enough to do science, you could go into politics. I retain that prejudice today. I also come from an older and tougher tradition that regards science as the business of testing theories with measured data from the outside world. Untestable hypotheses are not science but rather something else.

We are going to talk about the environment, so I should tell you I am the child of a mother who 60 years ago insisted on organic food, recycling, and energy efficiency long before people had terms for those ideas. She drove refrigerator salesmen mad. And over the years, I have recycled my trash, installed solar panels and low flow appliances, driven diesel cars, and used cloth diapers on my child—all approved ideas at the time.

I still believe that environmental awareness is desperately important.

The environment is our shared life support system, it is what we pass on to the next generation, and how we act today has consequences—potentially serious consequences—for future generations. But I have also come to believe that our conventional wisdom is wrongheaded, unscientific, badly out of date, and damaging to the environment. Yellowstone National Park has raw sewage seeping out of the ground. We must be doing something wrong.

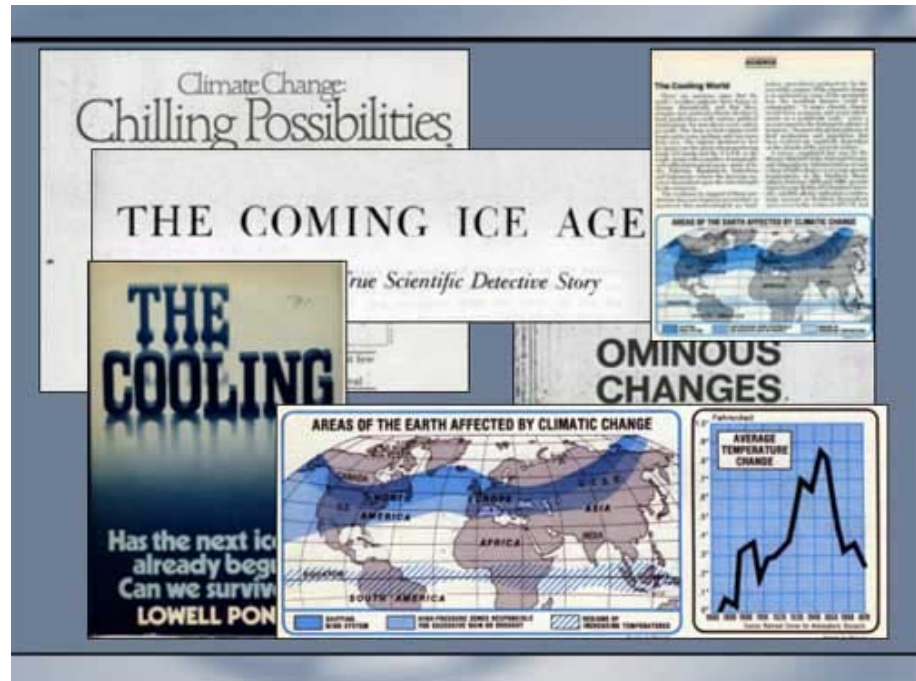
In my view, our approach to global warming exemplifies everything that is wrong with our approach to the environment. We are basing our decisions on speculation, not evidence. Proponents are pressing their views with more PR than scientific data. Indeed, we have allowed the whole issue to be politicized—red vs blue, Republican vs Democrat. This is in my view absurd. Data aren't political. Data are data. Politics leads you in the direction of a belief. Data, if you follow them, lead you to truth.



When I was a student in the 1950s, like many kids I noticed that Africa seemed to fit nicely into South America. Were they once connected? I asked my teacher, who said that that this apparent fit was just an accident, and the continents did not move. I had trouble with that, unaware that people had been having trouble with it ever since Francis Bacon noticed the same thing back in 1620. A German named Wegener had made a more modern case for it in 1912. But still, my teacher said no.

By the time I was in college ten years later, it was recognized that continents did indeed move, and had done so for most of Earth's history. Continental drift and plate tectonics were born. The teacher was wrong.

Now, jump ahead to the 1970s. Gerald Ford is president, Saigon falls, Hoffa disappears, and in climate science, evidence points to catastrophic cooling and a new ice age.



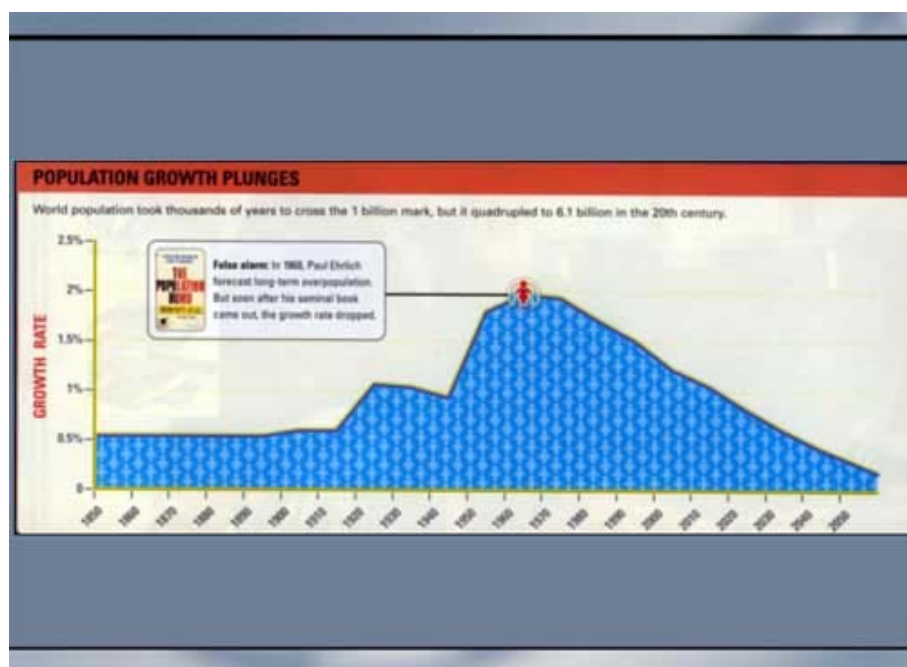
Such fears had been building for many years. In the first Earth Day in 1970, UC Davis's Kenneth Watt said, "If present trends continue, the world will be about four degrees colder in 1990, but eleven degrees colder by the year 2000. This is about twice what it would take to put us in an ice age." International Wildlife warned "a new ice age must now stand alongside nuclear war" as a threat to mankind. Science Digest said "we must prepare for the next ice age." The Christian Science Monitor noted that armadillos had moved out of Nebraska because it was too cold, glaciers had begun to advance, and growing seasons had shortened around the world. Newsweek reported "ominous signs" of a "fundamental change in the world's weather."

But in fact, every one of these statements was wrong. Fears of an ice age had vanished within five years, to be replaced by fears of global warming. These fears were heightened because population was exploding. By 1995, it was 5.7 billion, up 10% in the last five years.

Back in the 90s, if someone said to you, "This population explosion is overstated. In the next hundred years, population will actually decline." That would contradict what all the environmental groups were saying, what the UN was saying. You would regard such a statement as outrageous.

More or less as you would regard a statement by someone in 2005 that global warming has been overstated.

But in fact, we now know that the hypothetical person in 1995 was right. And we know that there was strong evidence that this was the case going back for twenty years. We just weren't told about that contradictory evidence, because the conventional wisdom, awesome in its power, kept it from us.



(This is a graph from Wired magazine showing rate of fertility decline over the last 50 years.)

I mention these examples because in my experience, we all tend to put a lot of faith in science. We believe what we're told. My father suffered a life filled with margarine, before he died of a heart attack anyway. Others of us have stuffed our colons with fiber to ward off cancer, only to learn later that it was all a waste of time, and fiber.

When I wrote Jurassic Park, I worried that people would reject the idea of creating a dinosaur as absurd. Nobody did, not even scientists. It was reported to me that a Harvard geneticist, one of the first to read the book, slammed it shut when he finished and announced, "It can be done!" Which was missing the point. Soon after, a Congressman announced he was introducing legislation to ban research leading to the creation of a dinosaur. I held my breath, but my hopes were dashed. Someone whispered in his ear that it couldn't be done.

But even so, the belief lingers. Reporters would ask me, "When you were doing research on Jurassic Park, did you visit real biotech labs?" No, I said, why would I? They didn't know how to make a dinosaur. And they don't.



So we all tend to give science credence, even when it is not warranted. I will show you many examples of unwarranted credence tonight. But here's an example to begin. This is the famous Drake equation from the 1960s to estimate the number of advanced civilizations in the galaxy.

$$N = N * fp ne fl fi fc fL$$

Where N is the number of stars in the Milky Way galaxy; fp is the fraction with planets; ne is the number of planets per star capable of supporting life; fl is the fraction of planets where life evolves; fi is the fraction where intelligent life evolves; and fc is the fraction that communicates; and fL is the fraction of the planet's life during which the communicating civilizations live.

The problem with this equation is that none of the terms can be known. As a result, the Drake equation can have any value from "billions and billions" to zero. An expression that can mean anything means nothing. The mathematical appearance is deceptive. In scientific terms—by which I mean testable hypotheses—the Drake equation is really meaningless.

And here's another example. Most people just read it and nod:



**“How Many Species Exist? The question takes on increasing significance as plants and animals vanish before scientists can even identify them.”**

Now, wait a minute...How could you know something vanished before you identified it? If you didn't know it existed, you wouldn't have any way to know it was gone. Would you? In fact, the statement is

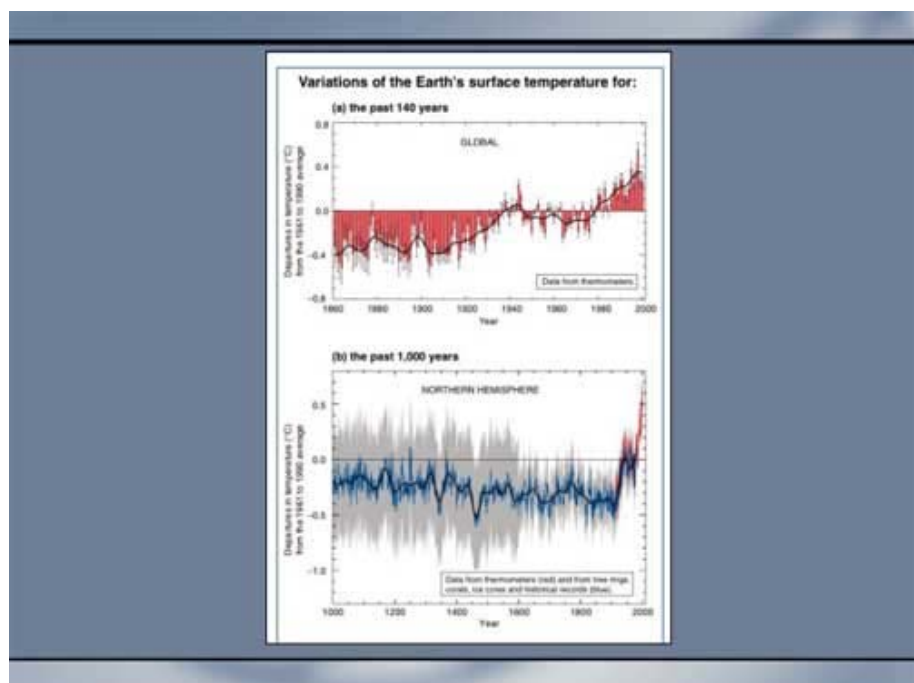
nonsense. If you were never married you'd never know if your wife left you.

Okay. With this as a preparation, let's turn to the evidence, both graphic and verbal, for global warming. As most of you have heard many times, the consensus of climate scientists believes in global warming. Historically, the claim of consensus has been the first refuge of scoundrels; it is a way to avoid debate by claiming that the matter is already settled. Whenever you hear the consensus of scientists agrees on something or other, reach for your wallet, because you're being had.

Let's be clear: the work of science has nothing whatever to do with consensus. Consensus is the business of politics. Science, on the contrary, requires only one investigator who happens to be right, which means that he or she has results that are verifiable by reference to the real world. In science, consensus is irrelevant. What is relevant is reproducible results. The greatest scientists in history are great precisely because they broke with the consensus.

And furthermore, the consensus of scientists has frequently been wrong. As they were wrong when they believed, earlier in my lifetime, that the continents did not move. So we must remember the immortal words of Mark Twain, who said, "Whenever you find yourself on the side of the majority, it is time to pause and reflect."

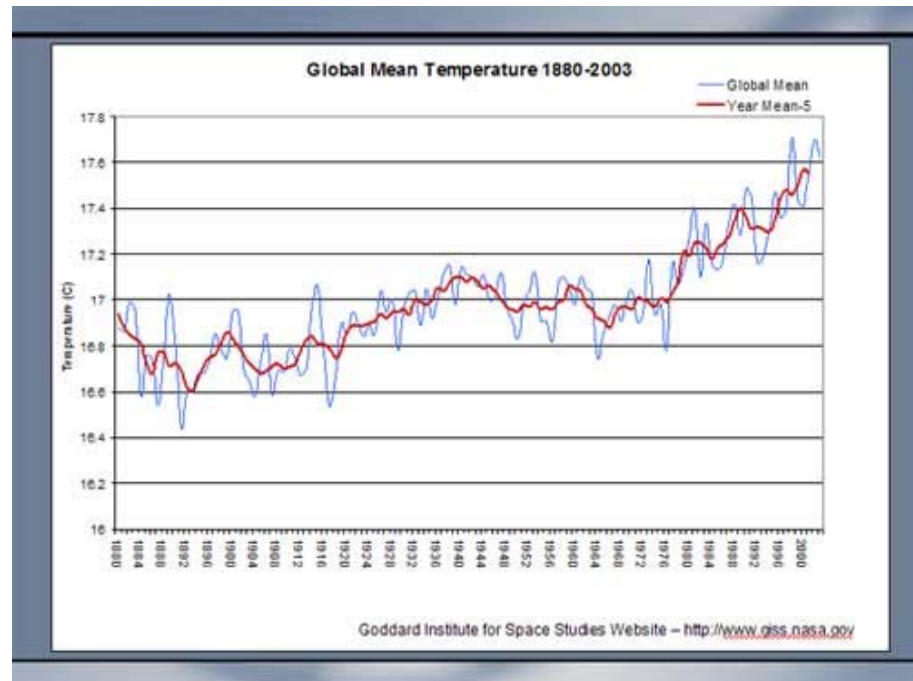
So let's look at global warming. We start with the summary for policymakers, which is what everybody reads. We will go into more detail in a minute, but for now, we assume the summary has all the important stuff, and turning to page three we find what are arguably the two most important graphs in climate science in 2001.



The top graph is taken from the Hadley Center in England, and shows global surface warming. The bottom graph is from an American research team headed by Mann and shows temperature for the last thousand years.

Of these two graphs, one is entirely discredited and the other is seriously disputed. Let's begin with the top graph.

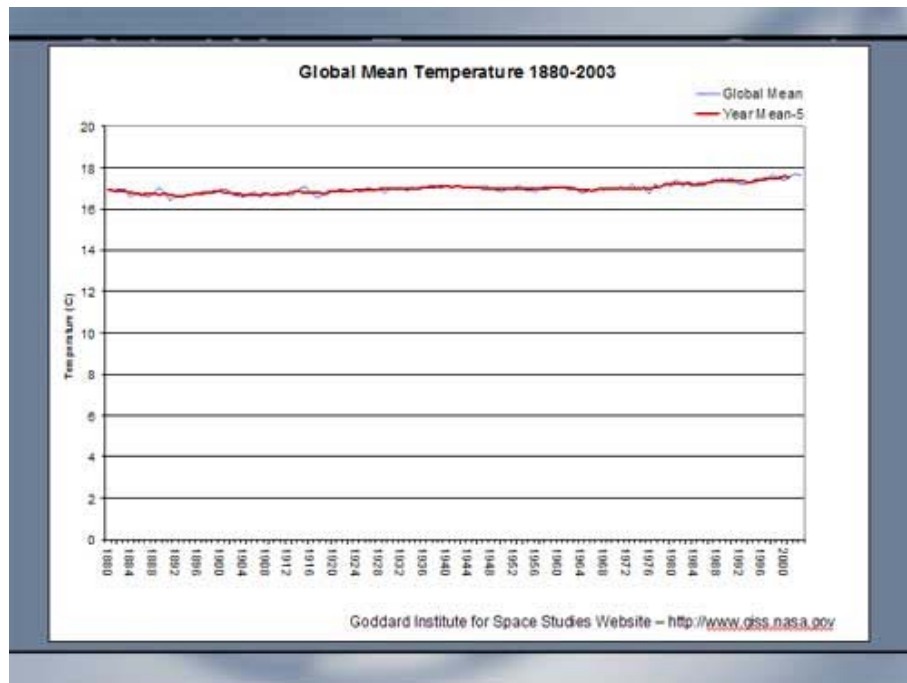
I have redrawn the graph in Excel, and it looks like this.



Now the first thing to say is that there is some uncertainty about how much warming has really occurred. The IPCC says the 20th century temperatures increase is between .4 and .8 degrees. The Goddard Institute says it is between .5 and .75 degrees. That's a fair degree of uncertainty about how much warming has already occurred.

But let's take the graph as given. It shows a warming of .4 degrees until 1940, which precedes major industrialization and so may or may not be a largely natural process. Then from 1940 to 1970, temperatures fell. That was the reason for the global cooling scare, and the fears that it was never going to get warm again. Since then, temperatures have gone up, as you see here. They have risen in association with carbon dioxide levels. And the core of the claim of CO2 driven warming is based on this thirty-five year record.

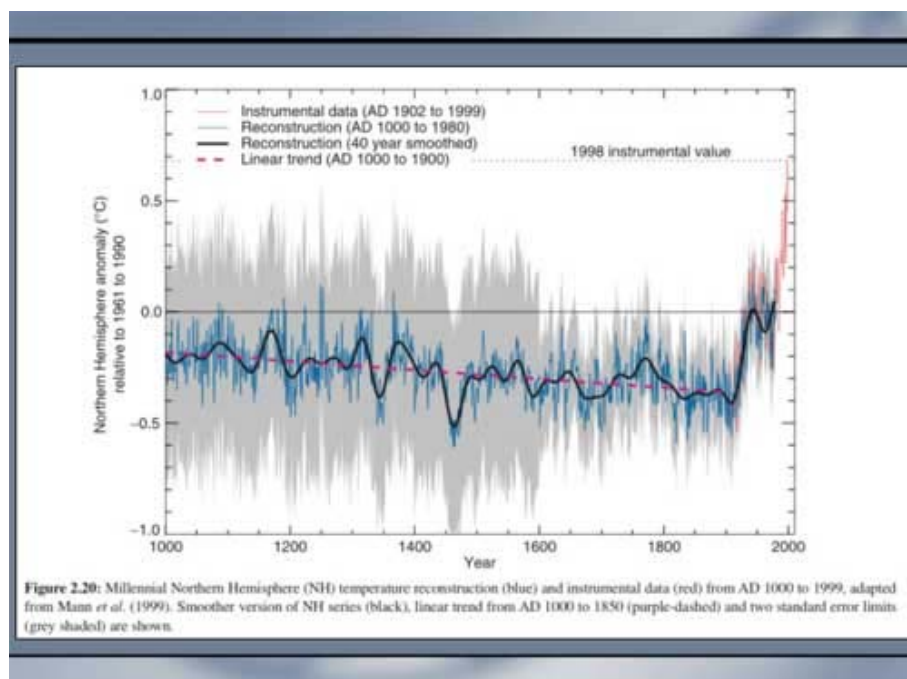
But we must remember that this graph really shows annual variations in the average surface temperature of the earth over time. That total average temperature is ballpark sixteen degrees. So if we graph the entire average fluctuation, it looks like this:



So all the interest is in this little fluttering on the surface. Let's be clear that I am graphing the data in a way that minimizes it. But the earlier graph maximizes it. If you put a ball bearing under a microscope it will look like the surface of the moon. But it is smooth to the touch. Both things are true. Question is which is important.

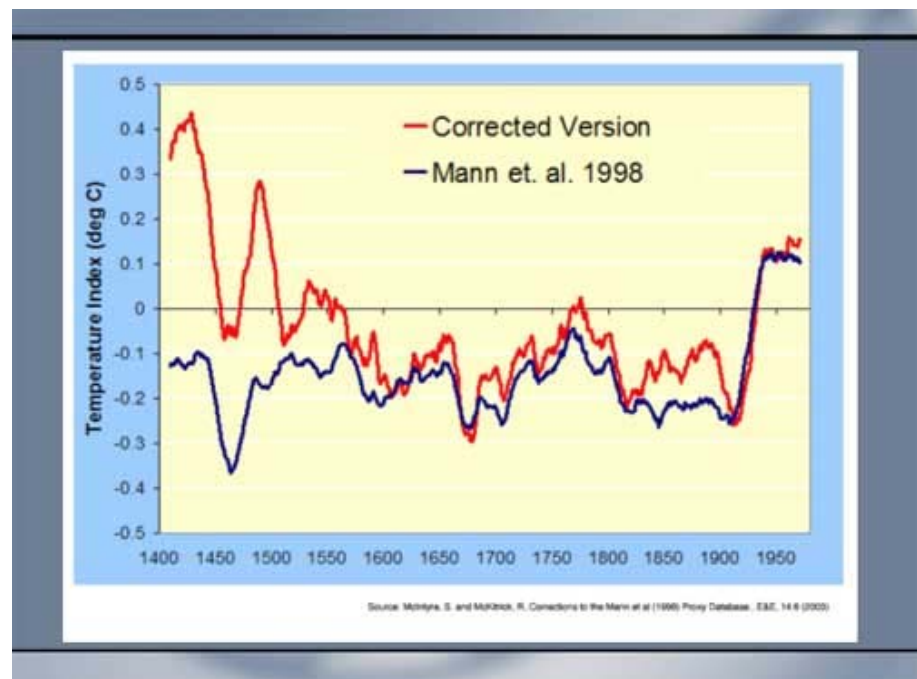
Since I think the evidence (NH) is weak, I urge you to bear this second graph in mind.

Now the question is, is this twentieth-century temperature rise extraordinary? For that we must turn to the second graph by Michael Mann, which is known as the "hockey stick."

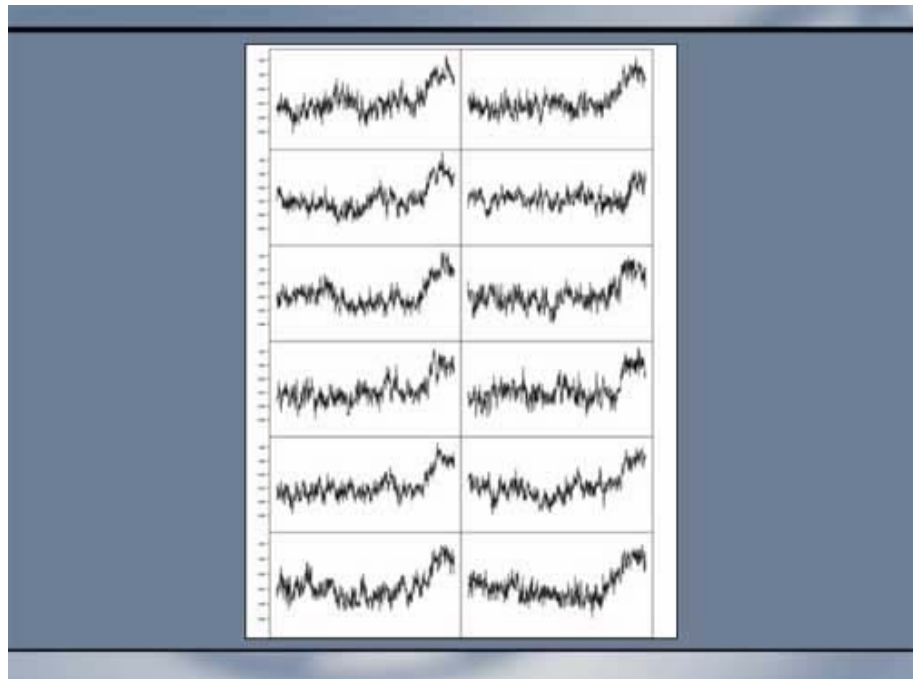




This graph shows the results of a study of 112 so-called proxy studies: tree rings, isotopes in ice, and other markers of relative temperature. Obviously there were no thermometers back in the year 1000, so proxies are needed to get some idea of past warmth. Mann's findings were a centerpiece of the last UN study, and they were the basis for the claim that the twentieth century showed the steepest temperature rise of the last thousand years. That was said in 2001. No one would say it now. Mann's work has come under attack from several laboratories around the world. Two Canadian investigators, McKittrick and McIntyre, re-did the study using Mann's data and methods, and found dozens of errors, including two data series with exactly the same data for a number of years. Not surprisingly, when they corrected all the errors, they came up with sharply differing results.

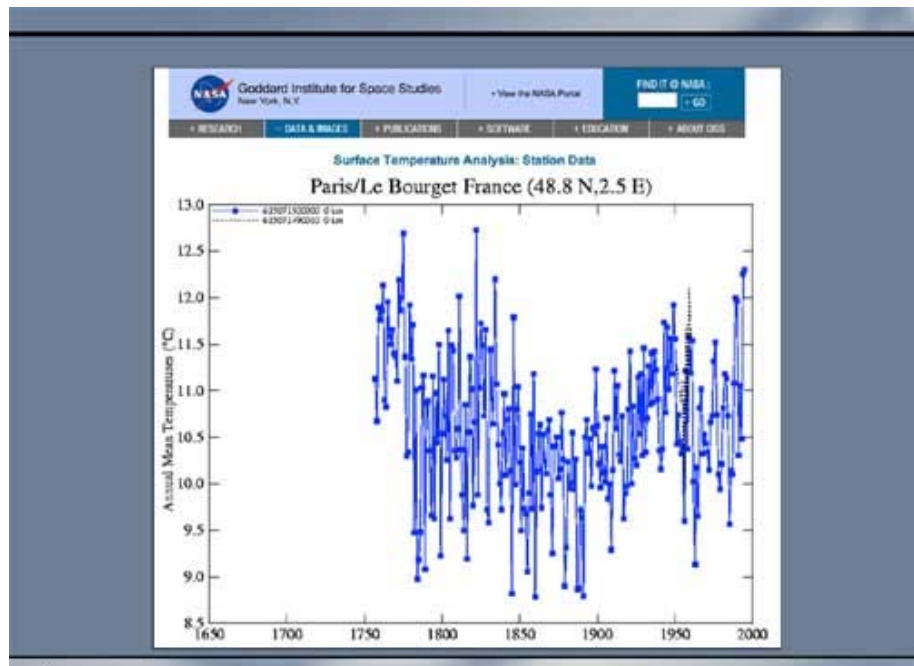


But still this increase is steep and unusual, isn't it? Well, no, because actually you can't trust it. It turns out that Mann and his associates used a non-standard formula to analyze his data, and this particular formula will turn anything into a hockey stick---including trendless data generated by computer.

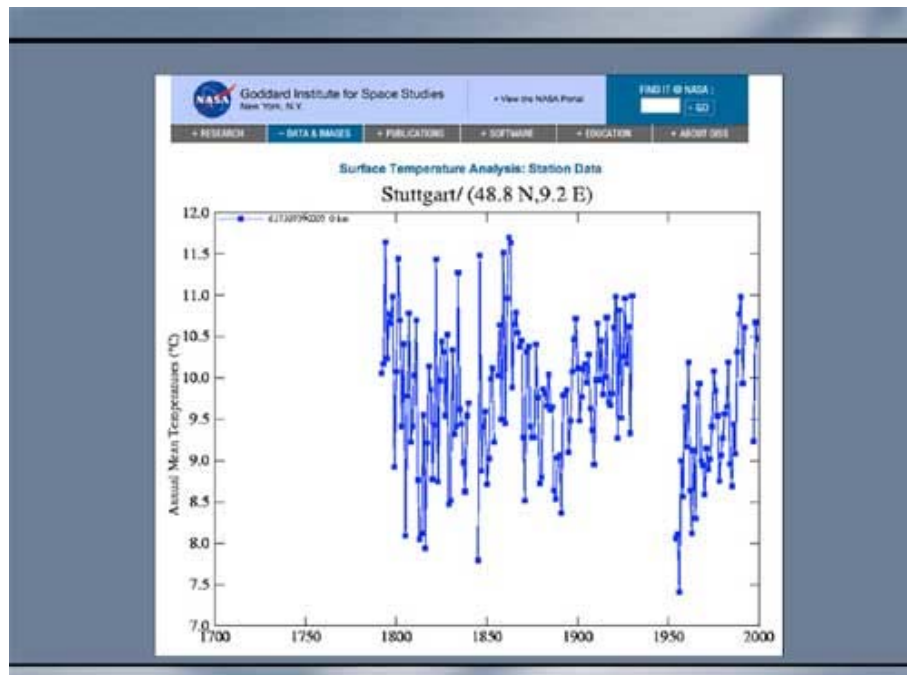


Physicist Richard Muller called this result “a shocker...” and he is right. Hans von Storch calls Mann’s study “rubbish.” Both men are staunch advocates of global warming. But Mann’s mistakes are considerable. But he will get tenure soon anyway.

But the disrepute into which his study has fallen leaves us wondering just how much variation in climate is normal. Let’s look at a couple of stations.

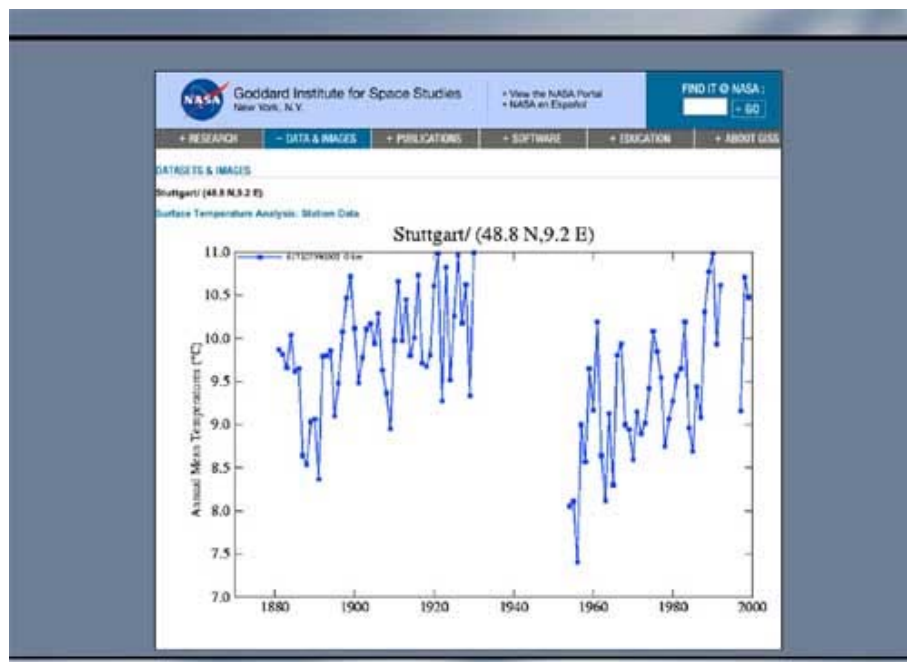


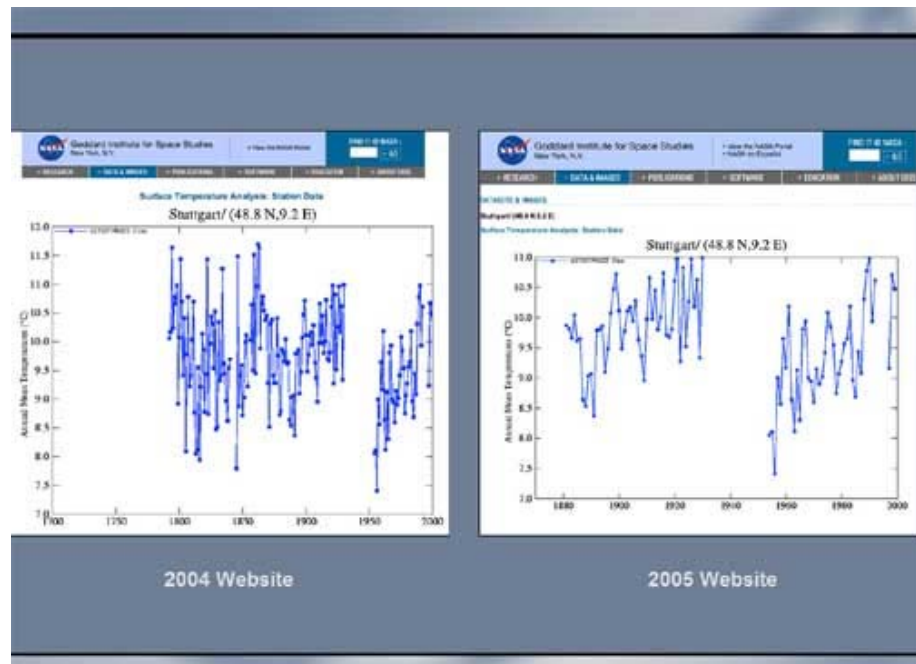
Here you see that the current temperature rise, while distinctive, is far from unique. Paris was hotter in the 1750s and 1830s than today.



Similarly, if you look at Stuttgart from 1950 to present, it looks dramatic. If you look at the whole record, it is put into an entirely different perspective. And again, it was warmer in the 1800s than now.

Now, these are graphs taken from the GISS website at the time I did my research for the book. For those of you think the science is all aboveboard, you might contemplate this. The data have been changed.



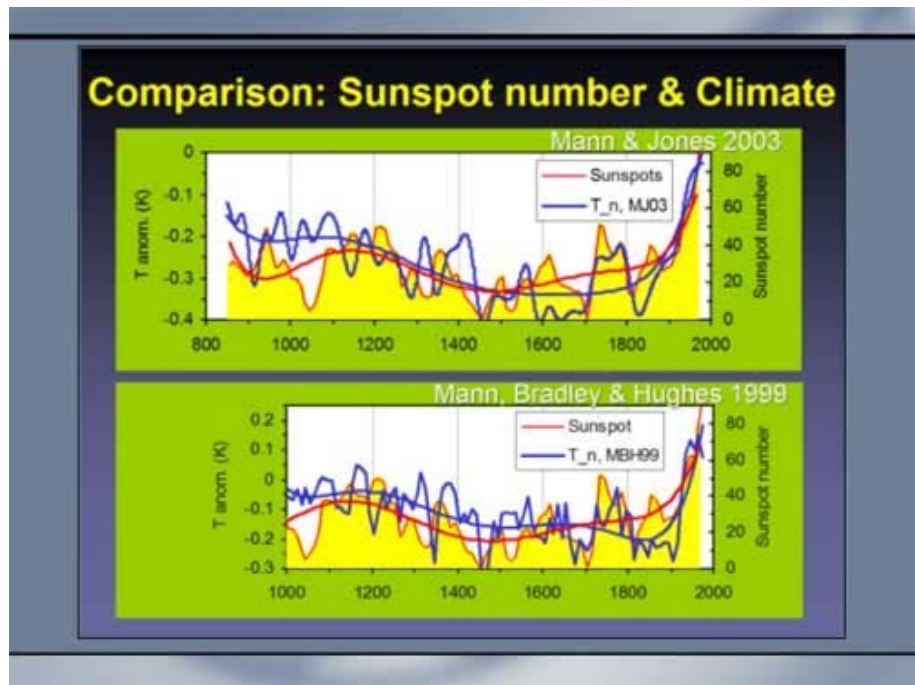


I have no comment on why the Goddard Institute changed the data on their website. But it clearly makes the temperature record look more consistently upward-trending and more fearsome than it did a few months ago.

All right. With the second graph demolished, it is time to return to the first. Now we must ask, if surface temperatures have gone up in the twentieth century, what has caused the rise? Most people have been taught that the increase is caused by carbon dioxide, but that is by no means clear.

Two factors that were previously not of concern have recently come to the renewed attention of scientists. The first is the sun. In the past it was imagined that the effect of the sun was fairly constant and therefore any rise in temperature must be caused by some other factor. But it is now clear from work of scientists at the Max Planck institute in Germany that the sun is not constant, and is right now at a 1,000 year maximum. The data comes from sunspots.

According to Solanki and his associates,



This shows that solar radiation and surface temperature are correlated until recent times. Solanki says that the sun is insufficient to explain the current temperatures, and therefore another factor is also at work, presumably greenhouse gases. But the question is whether the sun accounts for a significant part of twentieth-century warming. Nobody is sure. But it is likely to be some amount greater than was previously thought.

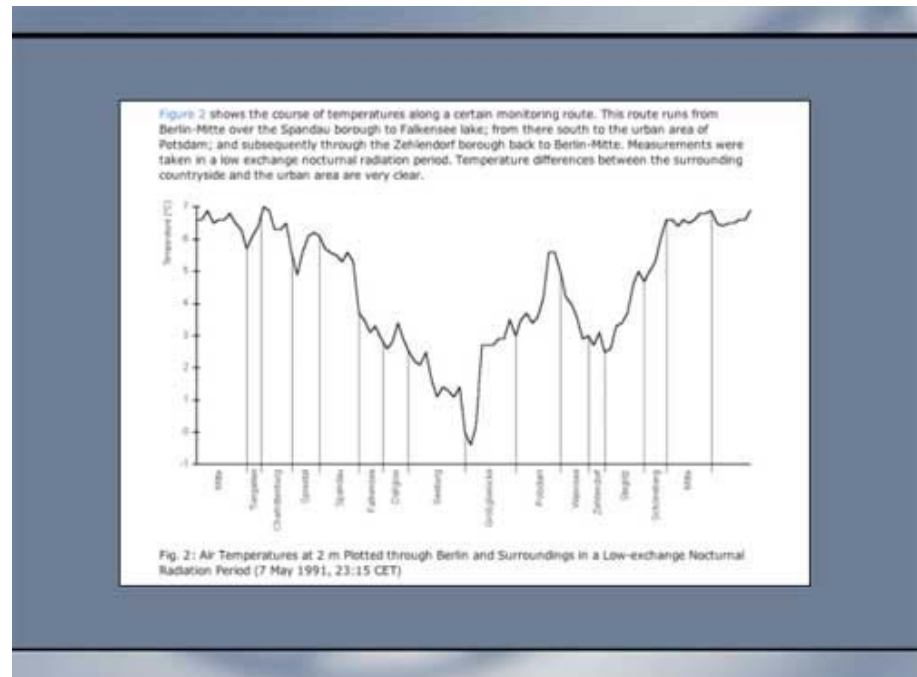
Now we turn to cities:



Another factor that could change the record is heat from cities. This is called the urban heat bias, and as with solar effects, scientists tended to think the effect, while real, was relatively minor. That is why the



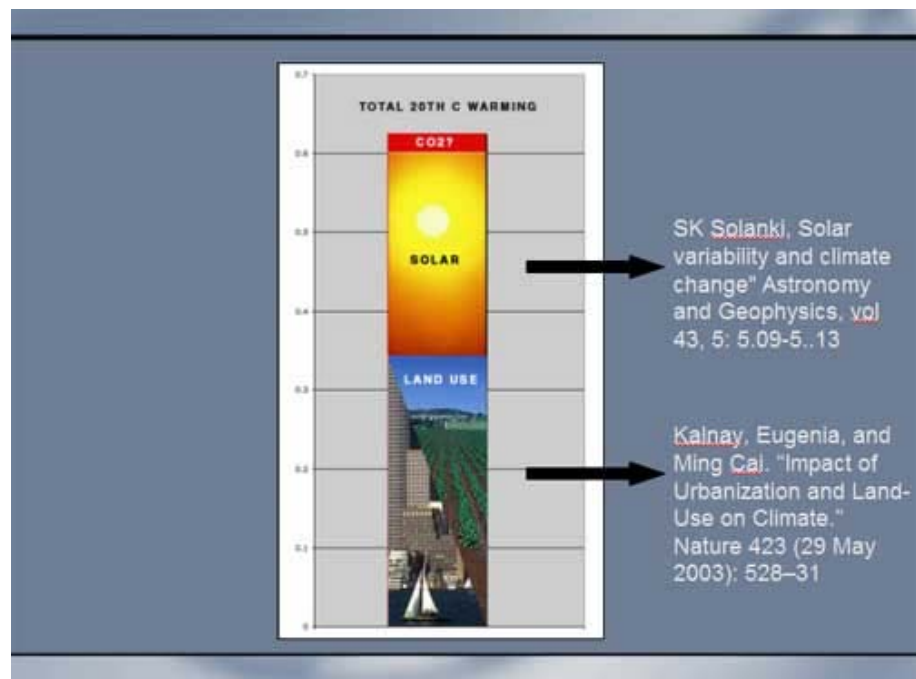
IPCC allowed only six hundredths of a degree for urban heating. But cities are hot: the correction is likely to be much greater. We now understand that many cities are 7 or 8 degrees warmer than the surrounding countryside.



(A temperature chart from a car driving around Berlin. The difference between city and country is 7 degrees.)

Some studies have suggested that the proper adjustment to the record needs to be four or five times greater than the IPCC allowance.

Now what does this mean to our record? Well remember, the total warming in the 20th century is six tenths of a degree.



If some of this is from land use and urban heating (and one studies suggests it is .35 C for the century), and some is solar heating (.25 C for century), then the amount attributable to carbon dioxide becomes less. And let me repeat: nobody knows how much is attributable to carbon dioxide right now.

But if carbon dioxide is not the major factor, it may not make a lot of sense to try and limit it. There are many reasons to reduce our dependence on fossil fuels, and I support such a reduction. But global warming may not be a good or a primary reason.

So this is very important stuff. The uncertainties are great.

And now, we turn to the most important issue. WHAT WILL HAPPEN IN THE FUTURE?

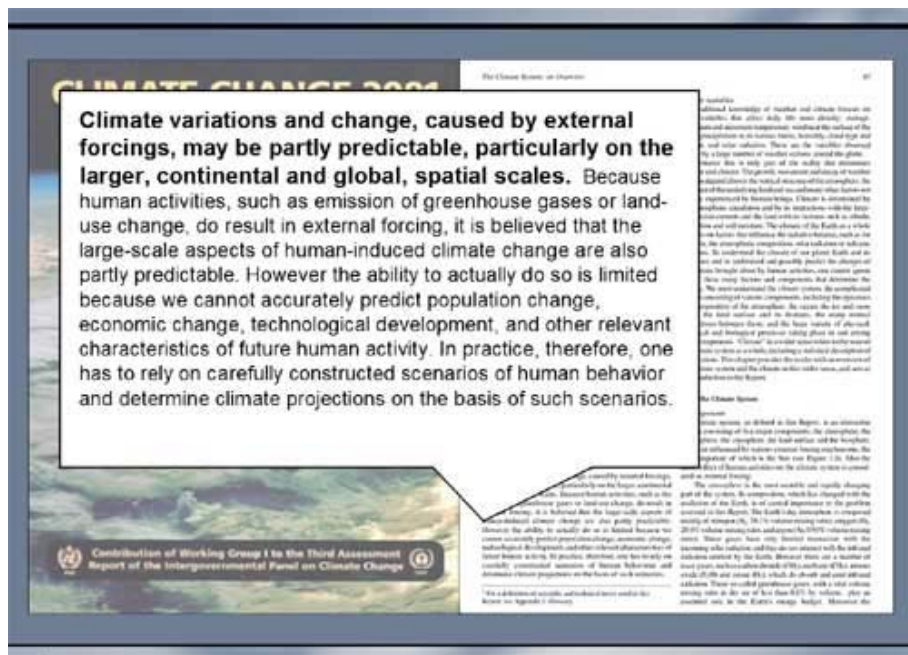
To answer this, we must turn to the UN body known as the Intergovernmental Panel on Climate Change. The IPCC, the gold standard in climate science.

In the last ten years, the IPCC has published book after book. And I believe I may be the only person who has read them. I say that because if any journalist were to read these volumes with any care they would come away with the most extreme unease---and not in the way the texts intend.

The most recent volume is the Third Assessment Report, from 2001. It contains the most up-to-date views of scientists in the field. Let's see what the text says. I will be reading aloud.

Sorry, but these books are written in academic-ese. They are hard to decipher, but we will do that.

Starting with the first section, The Climate System: An Overview, we turn to the first page of text, and on the third paragraph read:



**Climate variations and change, caused by external forcings, may be partly predictable, particularly on the larger, continental and global, spatial scales. Because human activities, such as the emission of greenhouse gases or land-use change, do result in external forcing, it is believed that the large-scale aspects of human-induced climate change are also partly predictable. However the ability to actually do so is limited because we cannot accurately predict population change, economic change, technological development, and other relevant characteristics of future human activity. In practice, therefore, one has to rely on carefully constructed scenarios of human behaviour and determine climate projections on the basis of such scenarios.**

Take these sentence by sentence, and translate into plain English. Starting with the first sentence. It's really just saying:

Climate may be partly predictable.

Second sentence means:

We believe human-induced climate change is predictable.

Third sentence means:

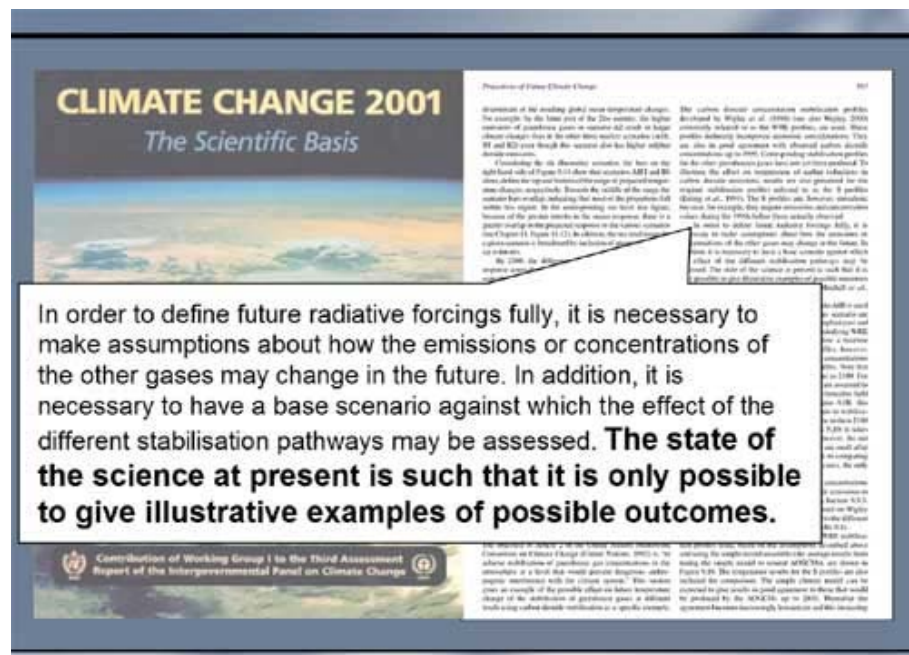
But we can't predict human behavior.

Fourth sentence:

Therefore we rely on "scenarios."

The logic here is difficult to follow. What does “may be partly predictable” mean? Is it like a little bit pregnant? We see in two sentences we go from may be predictable to is predictable. And then, if we can’t make accurate predictions about population and development and technology... how can you make a carefully-constructed scenario? What does “carefully-constructed” mean if you can’t make accurate predictions about population and economic and other factors that are essential to the scenario?

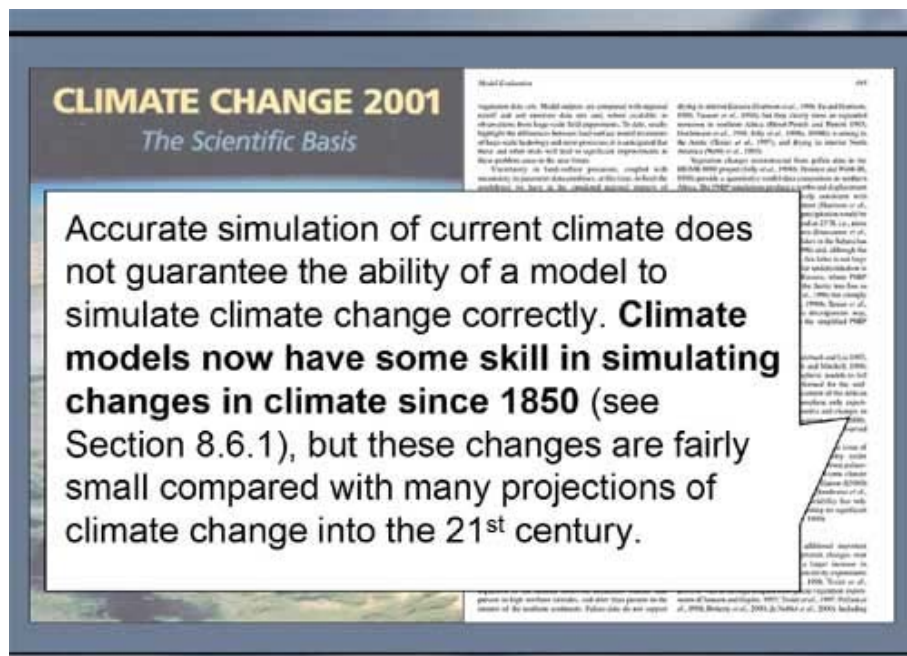
The flow of illogic is stunning. Am I are making too much of this? Let’s look at another quote:



**“The state of science at present is such that it is only possible to give illustrative examples of possible outcomes.”**

*Illustrative examples.* The estimates for even partial US compliance with Kyoto---a reduction of 3% below 1990 levels, not the required 7%---has been predicted to cost almost 300 billion dollars a year. Year after year. We can afford it. But if we are going to spend trillions of dollars, I would like to base that decision on something more substantial than “illustrative examples.”

Let’s look at another quote.



My concerns deepen when I read **“Climate models now have some skill in simulating changes in climate since 1850...”** SOME SKILL? This is not skill in predicting the future. This is skill in reproducing the past. It doesn’t sound like these models really perform very well. It would be natural to ask how they are tested.

NEXT QUOTE

**While we do not consider that the complexity of a climate model makes it impossible to ever prove such a model “false” in any absolute sense, it does make the task of evaluation extremely difficult and leaves room for a subjective component in any assessment.**

Now, the term “subjective” ought to set off alarm bells in every person here. Science, by definition, is not subjective. I will point out to you that this is precisely the kind of issue that has Americans furious about the EPA. We know you can’t let a drug company manufacture a drug and also test it---that’s unreliable, and everybody knows it. So why in this high stakes climate issue do we allow the same person who makes a climate model to test it?

The flaws in this process are well known. James Madison, our fourth President:

**No man is allowed to be judge in his own cause, because his interest would certainly bias his judgment, and not improbably, corrupt his integrity.**

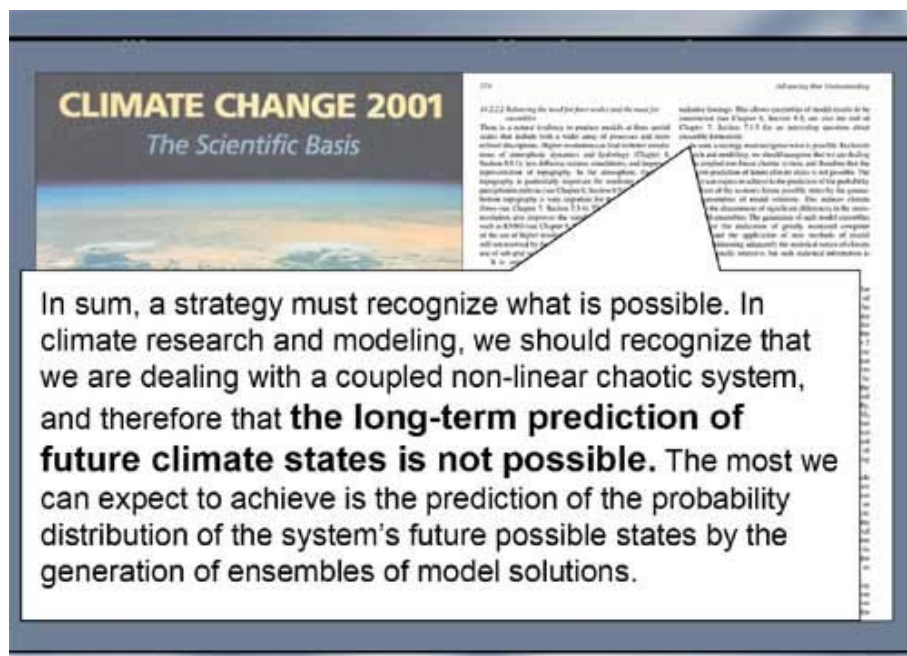
Madison is right.

Climate science needs some verification by outsiders.



## NEXT QUOTE

Again, am I making too much of all this? It turns out I am not. Late in the text, we read:

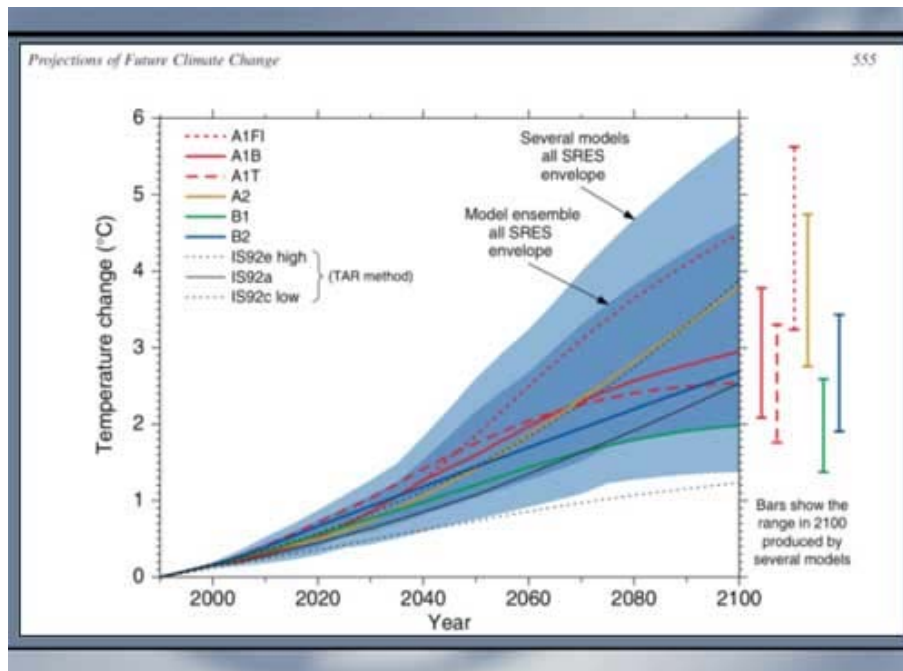


**“The long term prediction of future climate states is not possible.”**

Surely it should lead us to close the book at this point. If the system is non-linear and chaotic—and it is—then it can't be predicted, and if it can't be predicted, what are we doing here? Why are we worrying about the year 2100?

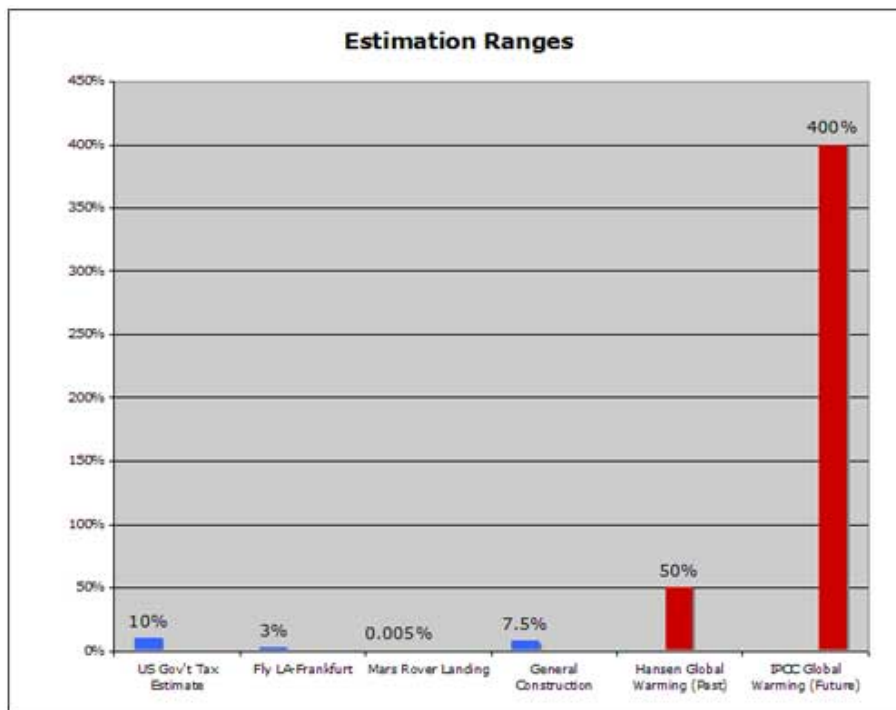
All right, you may be saying. Perhaps this is the state of climate science, as the IPCC itself tell us. Nevertheless we read every day about the dire consequences of global warming. What if I am wrong? What if a major temperature rise is really going to happen? Shouldn't we act now and be safe? Don't we have a responsibility to unborn generations to do so?

**NEXT CHART – Act Now or Later?**



Here is again the IPCC chart of predictions for 2100. As you see, they range from a low of 1.5 degrees to a high of 6 degrees. That is a 400% variation. It's fine in academic research. Now let's transfer this to the real world.

In the real world, a 400% uncertainty is so great that nobody acts on it. Ever.



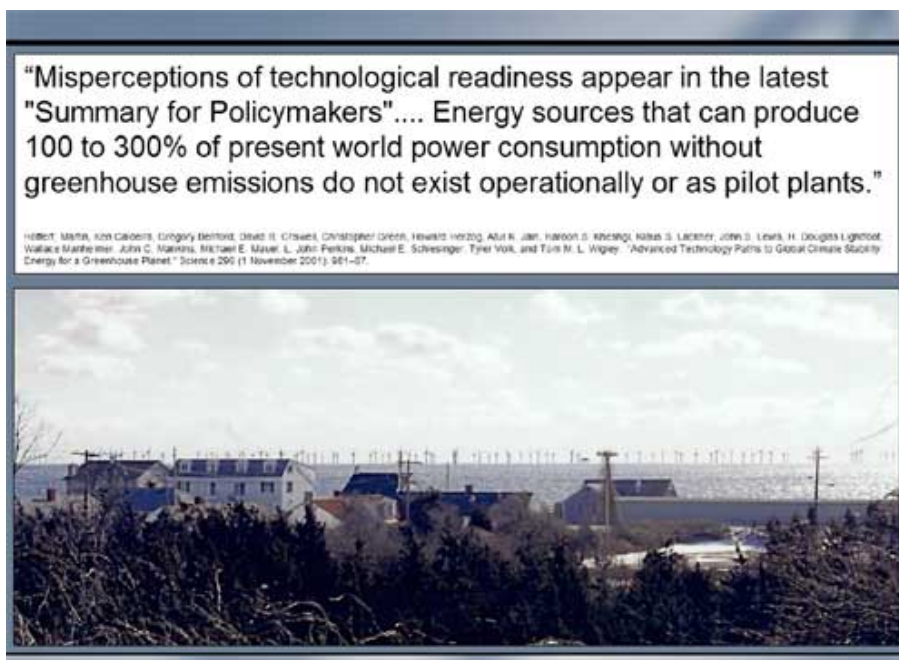
If you planned to build a house and the builder said, it will cost somewhere between a million and a half and six million dollars, would you proceed? Of course not, you'd get a new builder. If you told your boss you were going on vacation and would be gone somewhere

between 15 and 60 days, would he accept that? No, he'd say tell me exactly what day you will be back. Real world estimation has to be much, much better than 400%.

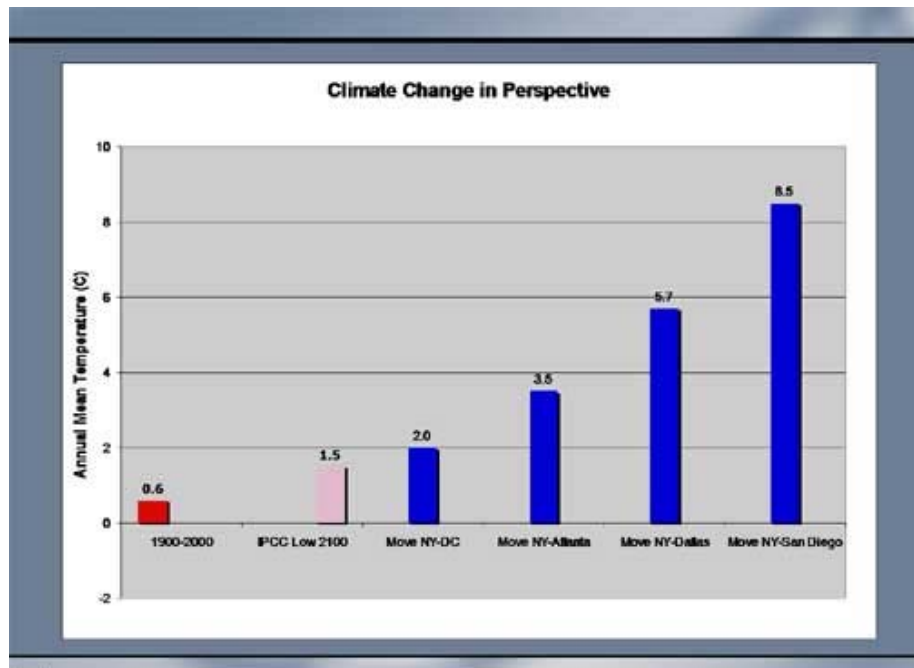
When all is said and done, Kyoto is a giant global construction project. In the real world nobody builds with that much uncertainty.

Next, we must face facts about the present. If warming is a problem, we have no good technological solutions at this point. Everybody talks wind farms, but people hate them. They're ugly and noisy and change the weather and chop birds and bats to pieces, and they are fought everywhere they are proposed. Here is the wind farm at Cape Cod, which has aroused everyone who lives there, including lots of environmentalists who are embarrassed but still...they don't want them. Who can blame them? A very large anti-wind faction has grown up in England, partly because the government are trying to put farms in the Lake District and other scenic areas.

But whether we like the technology or not, do we really have the capability to meet the Kyoto Protocols? Reporting in Science magazine, a blue-ribbon group of scientists concluded that we do not:



So, if we don't have good technology perhaps we should wait. And there are other reasons to wait. If in fact we are facing a really expensive construction job, we can afford it better later on. We will be richer. This is a 400 year trend.



Finally, I think it is important to recognize that we can adapt to the temperature changes that are being discussed. We are told that catastrophe will befall if we increase global temperature 2 degrees. But that is the difference in average temperature between New York and Washington DC. I don't think most New Yorkers think a move to Washington is balmy. Similarly, a move to San Diego is an increase of 9 degrees.

Of course this is not a fair comparison, because a local change is not the same as a global change. But it ought at least to alert you to the possibility that perhaps things are not as dire as we are being told. And were told thirty years ago, about the ice age.

Last, I want you to think about what it means to say that we are going to act now to address something 100 years from now. People say this with confidence; we hear that the people of the future will condemn us if we don't act. But is that true?

We're at the start of the 21st century, looking ahead. We're just like someone in 1900, thinking about the year 2000. Could someone in 1900 have helped us?

Here is Teddy Roosevelt, a major environmental figure from 1900. These are some of the words that he does not know the meaning of:

airport

antibiotic

antibody

antenna

computer

continental drift

tectonic plates

zipper

nylon

radio

television

robot

video

virus

gene

proton

neutron

atomic structure

quark

atomic bomb

nuclear energy

ecosystem

jumpsuits

fingerprints

step aerobics

12-step

jet stream

shell shock

shock wave

radio wave

microwave

tidal wave

tsunami



IUD

DVD

MP3

MRI

HIV

SUV

VHS

VAT

whiplash

wind tunnel

carpal tunnel

fiber optics

direct dialing

dish antennas

gorilla

corneal transplant

liver transplant

heart transplant

liposuction

transduction

maser

taser

laser

acrylic

penicillin

Internet

interferon

nylon

rayon

leisure suit

leotard

lap dancing

laparoscopy

arthroscopy

gene therapy

bipolar

moonwalk

spot welding

heat-seeking

Prozac

sunscreen

urban legends

rollover minutes

Given all those changes, is there anything Teddy could have done in 1900 to help us? And aren't we in his position right now, with regard to 2100?

Think how incredibly the world has changed in 100 years. It will change vastly more in the next century. A hundred years ago there were no airplanes and almost no cars. Do you really believe that 100 years from now we will still be burning fossil fuels and driving around in cars and airplanes?



The idea of spending trillions on the future is only sensible if you totally lack any historical sense, and any imagination about the future.

If we should not spend our money on Kyoto, what should we do instead? I will argue three points.

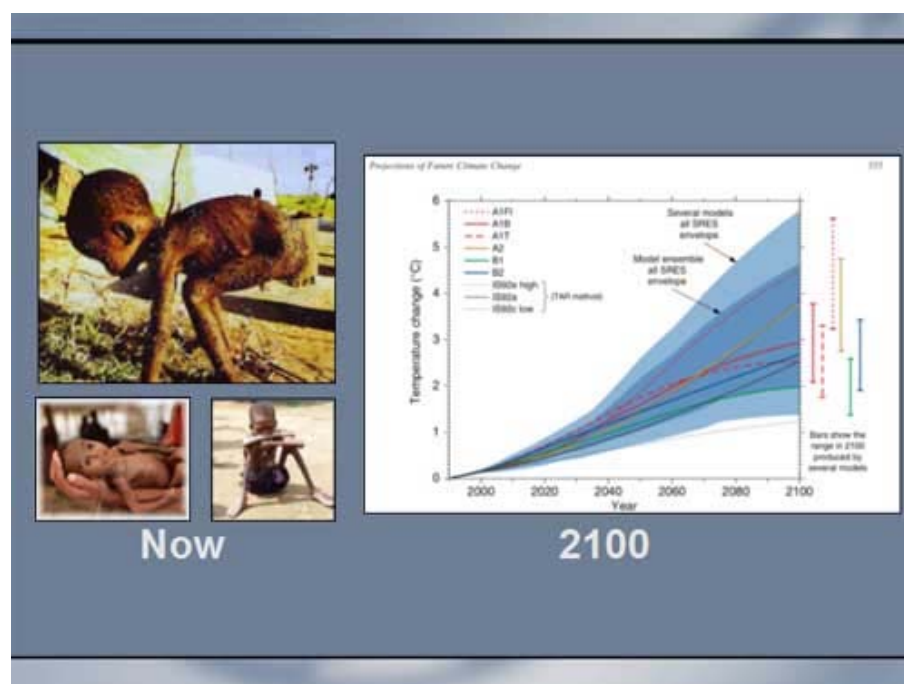
First, we need to establish 21st century policy mechanisms. I want to return to those pages from the IPCC. The fact is if we required the same standard of information from climate scientists that we do from drug companies, the whole debate on global warming would be long over. We wouldn't be talking about it. We need mechanisms to insure a much, much higher standard of reliability in information in the future.

Second, we need to deal correctly with complexity of non-linear systems. The environment is a complex system, a term that has a specific meaning in science. Beyond being complicated, it means that interacting parts that modify each other have the capacity to change the output of the system in unexpected ways. This fact has several ramifications. The first is that the old notion of the balance of nature is thoroughly discredited. There is no balance of nature. To think so is to share an agreeable fantasy with the ancient Greeks. But it is also a shocking change for us, and we resist it. Some now talk of "balance in nature," as a way to keep the old idea alive. Some claim there are multiple equilibrium states, but this is just a way of pretending that the balance can be attained in different ways. It is a misstatement of the truth. The natural system of inherently chaotic, major disruption is the rule not the exception, and if we are to manage the system we are going to have to be actively involved.

This represents a revision of the role of mankind in nature, and a revision of the perception of nature as something untouched. We now know that nature has never been untouched. The first white visitors to the New World didn't understand what they were looking at. In California, Indians burned old growth forest with such regularity that there is more old growth today than there was in 1850. Yellowstone was a beauty spot precisely because the Indians hunted the elk and moose to the edge of extinction. When they were prevented from hunting in their traditional grounds, Yellowstone began its complex decline.

We now have research to help us formulate strategies for management of complex systems. But I am not sure we have organizations capable of making these changes. I would also remind you that to properly manage what we call wilderness is going to be stupefyingly expensive. Good wilderness is expensive!

Finally, and most important—we can't predict the future, but we can know the present. In the time we have been talking, 2,000 people have died in the third world. A child is orphaned by AIDS every 7 seconds. Fifty people die of waterborne disease every minute. This does not have to happen. We allow it.



What is wrong with us that we ignore this human misery and focus on events a hundred years from now? What must we do to awaken this phenomenally rich, spoiled and self-centered society to the issues of the wider world? The global crisis is not 100 years from now—it is right now. We should be addressing it. But we are not. Instead, we cling to the reactionary and antihuman doctrines of outdated environmentalism and turn our backs to the cries of the dying and the starving and the diseased of our shared world.

And if we are going to remain too self-involved to care about the third world, can we at least care about our own? We live in a country where 40% of high school graduates are functionally illiterate. Where schoolchildren pass through metal detectors on the way to class. Where one child in four says they have seen a murdered person. Where millions of our fellow citizens have no health care, no decent education, no prospects for the future. If we really have trillions of dollars to spend, let us spend it on our fellow human beings. And let us spend it now. And not on our impossible fantasies of what may happen one hundred years from now.

Thank you very much.

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